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ABSTRACT

The purpose of this study was to measure the development of forethought in children as a function of age, thereby documenting a normal use of this facility. It was hypothesized that forethought would develop on a continuum increasing with age, with no significant differences due to sex of the child. To test this hypothesis, items were pooled which were related to children's development of five capabilities: future time comprehension, the comprehension of death, the understanding of real time consequences, the understanding of cyclic variations in the natural environment, and anticipation of important future events. One preliminary multidimensional questionnaire consisting of the pooled items was used; the questionnaire was prescreened and adjusted for vocabulary level across ages and was read aloud, if necessary, to the youngest subjects. Subjects were 300 children ranging in age from 3 through 14 years who attended schools in the San Francisco Bay area. Six groups, each spanning 2 years of the age range, were formed. Results, which support the hypothesis and reveal that future time comprehension was the most important factor of those studied, are discussed. Related materials, including data tables, are provided in appendices. (RH)

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AGE DEPENDENT FORETHOUGHT
IN CHILDREN

A Thesis
Presented to
the Faculty of the Department of Psychology
San Jose State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Linda Joy Sandham
May 1980

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CHAPTER I

INTRODUCTION

The existence of human memory and the ability to plan and anticipate make it seem probable that notions of the future must have existed in some form throughout human history. Arieti (1957) proposed that phylogenetically, forethought, i.e., the capacity to foresee or predict future events, even when there are no external stimuli which are directly or indirectly related to these events, appeared at the primordial eras of humanity. He stated that:

Perhaps in some human races, which lived during what was called by Freud the cannibalistic age of humanity, anticipation was not yet possible, or was present to a very limited degree. At that time men were interested mainly in activities like cannibalism and hunting, which are related to the immediate present time. Soon, however, and exactly in what may be called the anal stage of humanity, man learned to anticipate the future and to protect himself from distant danger. He protected himself against famine with the habit of hoarding (which is characteristic of this anal stage of humanity) and by experiencing feeling of long-circuited anxiety. Often he tried to protect himself from this anxiety by magic methods (which correspond to the compulsions of the psychoneurotic). Only a few primitives of today seem to be at a stage still preceding the anal or long-anticipatory. . . . More and more the historical time was approached, anticipation of a more and more distant future was possible to the humans (p. 475).

Russell (1945) describes this differential characteristic between what he calls the savage man, who is interested

only in present problems, and the civilized man, who is able to foresee the future, in the following way:

The civilized man is distinguished from the savage mainly by prudence, or, to use a slightly wider term, forethought. He is willing to endure present pains for the sake of future pleasures, even if the future pleasures are rather distant. This habit began to be important with the rise of agriculture, no animal and no savage would work in the spring in order to have food next winter, except for a few purely instinctive forms of action, such as bees making honey, or squirrels burying nuts. In these cases, there is no forethought; there is a direct impulse to an act which, to the human spectator, is obviously going to prove useful later on. True forethought only arises when a man does something towards which no impulse urges him, because his reason tells him that he will profit by it at some future date. Hunting requires no forethought, because it is pleasurable; but tilling the soil is labour, and cannot be done from spontaneous impulse (p. 15).

Russell thus describes the shifting from what is psycho-analytically known as the pleasure principle to the reality principle (Arieti, 1957).

One of the initial clinical references to forethought was made by Freud (1936). He proposed that anxiety was a result of the ability to anticipate or foresee future events. Freud explained that the individual makes an important advance in the capacity for self-preservation if a traumatic situation can be foreseen and expected.

Arieti (1957) suggested that the ability to anticipate future events requires a certain degree of intellectual evolution or maturation not yet acquired by pre-human

species, or by the child in the first year of life.

Several theorists have commented on the developmental stages of forethought across the lifespan (see Table 1).

Table 1

Chronological and Psychosexual
Stages of the Development of Forethought in
Human Beings and Characteristics of these Stages

Psychosexual		
Age	Stage	Characteristics
0-1	Oral	Expectation and short-circuited anxiety are present (Arieti, 1957). The baby expects the parents or their substitutes, to relieve him or her from uncomfortable sensations, e.g., hunger, thirst, loneliness (English & Pearson, 1945). However, the child is unable to postpone immediate pleasure for some future gratification (Arieti, 1957).
2	Anal	Anticipation originates during the anal period.

Table 1 (cont.)

Chronological and Psychosexual
Stages of the Development of Forethought in
Human Beings and Characteristics of these Stages

Psychosexual		
Age	Stage	Characteristics
		At this stage of development, the child becomes able to postpone immediate pleasure for some future gratification. This is the stage at which the reality principle originates (Arieti, 1957). The child learns to postpone bowel movements in order to obtain the immediate or distant approval or love of his or her parents (English & Pearson, 1945). However, his or her perception of time is still very primitive and inadequate (Arieti, 1957).

Table 1 (cont.)

Chronological and Psychosexual
Stages of the Development of Forethought in
Human Beings and Characteristics of these Stages

Psychosexual		
Age	Stage	Characteristics
3-6	Latency	The ability to anticipate the future will develop enormously (Arieti, 1957).
7-9		
10-18	Adolescence	In the early part of adolescence, the ability to anticipate the future will expand to include all its implications (Arieti, 1957).
Adult Through Middle Age		
		During this period future anticipation occupies the greatest part of human thoughts and determines the greatest number of human actions. Such phenomena or institutions as religion, life insurance, armament, etc., owe

Table 1 (cont.)

Chronological and Psychosexual
Stages of the Development of Forethought in
Human Beings and Characteristics of these Stages

Psychosexual		
Age	Stage	Characteristics
		their origin and development to this process of anticipation. When the ontogenetic development of the function of anticipation is completed, the individual is able to revive the past and to anticipate the future. This enables the individual to apply past and future phenomenon to the present (Arieti, 1957).
Senescence		Planfulness declines as a function of age after middle age is attained (Cameron, Desai, Bahador & Dremel, 1977-78; Cumming & Henry, 1961).

Table 1 (cont.)

Chronological and Psychosexual
Stages of the Development of Forethought in
Human Beings and Characteristics of these Stages

Psychosexual		
Age	Stage	Characteristics
		Future anticipation as related to the self is decreased in normal senescence. The aging individual becomes less and less concerned about the future, and when senescence arrives, individual interests are practically confined to the present time (Arieti, 1957).

It is apparent from this review in Table 1 that several theorists have documented the commencement of forethought in the human infant, and characteristics of this facility as a function of age. However, literature has not experimentally addressed this issue. The purpose of this research, therefore, was to experimentally address and document the development of forethought in children as a function of age.

There are potentially a number of ways of thinking about the understanding of the future which include the development of: (a) the sense of time, (b) the comprehension of death, (c) the understanding of real time consequences, (d) the understanding of cyclic variations in the natural environment, and (e) anticipation of important future events.

The Development of the Sense of Time in Children

According to Piaget (1969), the logical conception of time involves two variables, i.e., the order of successive events and the duration of intervals between these events. The understanding of time develops as a relationship between these two variables; in order to group events from two different series in relation to each other, it is necessary to know both the order of each of the series and the exact duration between the events in both series. The operations by which this understanding becomes possible are the ability to reconstruct a sequence of events (i.e., ordering), the classification of temporal intervals between succeeding temporal points (i.e., duration), and the coordination of order of events and classification of duration, or synchronism of two different successions of events (i.e., measurement of time).

The development of these temporal operations progresses, according to Piaget, through three stages: (a) the

sensori-motor stage (0-2 years), during which the child is unable to differentiate between temporal and spatial order, (b) the preoperational stage (2 to 7 years), during which the child's judgements of succession, including seriation and simultaneity, depend upon the equality and inequality of speed, and the understanding of duration is based on speed and distance travelled, and (c) the concrete-operational stage (7 to 11 years), during which the coordination between succession of events and duration is accomplished, enabling the child to organize systems of measuring time and to develop a logical understanding of time.

Included in the development of the sense of time is the child's understanding of the future documented by its use of words or phrases implying future time. Previous studies (Ames, 1946; Bradley, 1948; Harner, 1973; Oakden & Sturt, 1922; Schecter, Symonds & Bernstein, 1955; Springer, 1952) document the development of the knowledge of past, present, and future time in children as a function of age. Ames (1946) suggests that, in spite of individual variation, time concepts develop in a relatively uniform sequence from child to child, and at about the same relative time for every child, suggesting that acquisition and use of time concepts depends chiefly upon maturational factors and that there exists an underlying ground plan of growth, and a patterning process. Ames observed that the child

lives chiefly in the present until approximately 2½ years of age at which time a definite advance takes place in that the child now uses freely words implying past, present, and future time. At 3 years of age the child can answer a few questions involving future time concepts and this ability develops gradually with increased age. She sets the understanding of the meaning of time at 8 years of age.

The Development of the Understanding of Death in Children

Another means of measuring the child's development of the future sense is by measuring its understanding of the ineluctable laws of nature, a good example of which is death. Nagy (1948) analyzed the words and drawings of 378 Hungarian children ranging in age from 3 to 10 and found evidence for three major developmental phases of their concept of death. In Stage 1, occurring between the age of 3 and 5, the child usually does not recognize that death is a regular and final process. At Stage 2, between the age of 5 and 9, children think of death as final, however, there continues to be a belief that death can be avoided. At Stage 3, at the ages of 9 and 10, children tend to have a clear recognition that death is an internal process that is not only final but inevitable, that it will happen to them, and that it is a universal phenomenon.

Other studies have addressed the child's understanding of death (Anthony, 1972; Childs & Wimmer, 1971; Koocher, 1973; Maurer, 1961; Rochlin, 1965; Swain, 1975; Zweig, 1976). Swain (1975) investigated the concepts of death held by children aged 2 through 16 and whether these concepts differed according to chronological age of the child, sex of the child, level of parental education, or degree of religious influence within the family. Swain found that of these variables, age was the only significant factor, concomitant with social and intellectual development, related to the concept of death held by children. Children between the ages of 2 to 4 tended to view death as reversible rather than final, as improbable or escapable rather than inevitable, and as not personally applicable to them. Children aged 5 to 7 expressed their belief that the natural causation of death makes it ultimately inevitable and they expressed the belief that death was applicable to them personally but primarily at a time remote from today. The children in the mid-teens (ages 14 to 16) expressed the broad concept that natural causation does make death inevitable, although possibly remote, but that death can occur at any time for any reason.

Although there is disagreement among these studies as to the specific age at which children comprehend the inevitability of death, it seems clear that a more comprehen-

sive understanding of death develops with an increase in age.

The Development of the Understanding of Real Time Consequences and Cyclic Variations in the Natural Environment

This process includes the understanding of the physical laws of nature and the inevitable consequences of these laws. For example, events in this category include seasonal changes, the effects of gravitational force on objects, and the effects of temperature change on water.

Anticipation of Important Future Events

Arieti (1957) suggests that to predict future events it is necessary to be able to connect in a certain sequence a series of events, e.g., phenomena A (sunset) with phenomena B (night), or phenomena A (October) with phenomena B (Halloween).

The purpose of this study then, was to measure the development of forethought in children as a function of age thereby documenting a normal use of this facility. In view of the findings of the studies mentioned above, the following hypothesis was formulated: Forethought will develop on a continuum increasing with age with no significant differences due to sex of the child. To test this hypothesis, the researcher pooled items relating to the different approaches mentioned above that reflect the development of forethought which include: (a) the development of future time comprehension, (b) the development of

the comprehension of death, (c) the development of the understanding of real time consequences, (d) the development of the understanding of cyclic variations in the natural environment, and (e) the development of anticipation of important future events. Based on subjects' responses to these items, a multidimensional questionnaire was developed to measure the developmental stage of forethought a child has attained.

The independent variables in this study were the age and sex of the subjects, and the subscales on the multidimensional questionnaire. The subscores on the subscales were the dependent variables.

CHAPTER II

METHOD

Subjects

The subjects of the study were 300 children who ranged in age from 3 through 14. Children under age 3 were not included because they are generally unable to communicate verbally with facility, thus necessitating a somewhat different methodology.

The sample was drawn from Montebello Montessori Pre-School, Palo Alto Montessori Pre-School, Roy Cloud School, Majestic Way School, and McKinley School, which are located in the San Francisco Bay Area. Subjects were selected upon the basis of availability for participation in the study and parental permission to do so. (See Appendix C for Parental Permission Form.)

Age groups were arbitrarily divided into six groups of two years each. The distribution of subjects by age and sex is shown in Table 2.

Table 2

Distribution of Subjects by Age and Sex

Age	Sex		Total
	Male	Female	
3-4	25	25	50
5-6	25	25	50
7-8	25	25	50

Table 2 (cont.)

Distribution of Subjects by Age and Sex			
Age	Sex		Total
	Male	Female	
9-10	25	25	50
11-12	25	25	50
13-14	25	25	50

Materials

One preliminary multidimensional questionnaire was used to measure the development of forethought in children (see Appendix B). The questionnaire was pre-screened for vocabulary level across ages and adjusted accordingly. However, the meaning of the questions did not change across ages.

Procedure

Written or verbal approval to conduct the study was first obtained from the school district office and/or the participating school. Second, Parental Permission Forms were obtained from the parents of the subjects by participating teachers.

Following completion of these steps, each subject was administered the questionnaire. Subjects who were unable to read and/or write were interviewed individually by the researcher. These subjects were first read the following

instructions, "Your parents have given me permission to ask you some questions. This is not a test so if you do not know the answer please say, 'I don't know'." The researcher then read each question from the questionnaire and the possible answers to the forced choice questions and recorded the subjects' responses.

Subjects who were able to read and write were read the following instructions before they completed the questionnaire, "Your parents have given you permission to complete this questionnaire. This is not a test. When two answers are given circle the best choice. When a line is given fill in the answer. If you do not know the answer please write in, 'I don't know'."

Scoring of Variables

A correct response constituted a single score. The total score for each subjects was derived by summing the number of correct responses as determined by the Score Key (see Appendix C). The responses to each item, for each subject, were keypunched on cards to facilitate the statistical analyses.

CHAPTER III

RESULTS

Results supported the hypothesis, i.e., forethought develops on a continuum increasing with age with no significant differences due to sex of the child.

The means and standard deviations for the number of correct responses on the preliminary forethought questionnaire for each of the 12 groups are presented in Table 3.

Factor Analyses

Variables from the preliminary forethought questionnaire were parceled into subscales. In selecting the variables to be included in each subscale, the following steps were taken. First, an intercorrelation matrix for the 66 variables for all subjects was computed (see Appendix D). The intercorrelation matrix utilized the SPSS: Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) Pearson correlation computer subprogram. Second, variables which were highly correlated and/or which the author subjectively decided measured similar or related areas, were parceled into 20 subscales (see Appendix E). The means and standard deviations for each subscale for all subjects, for all males, and for all females are shown in Tables 4, 5, and 6 respectively.

From these scores, three intercorrelation matrices

Table 3

Means and Standard Deviations for
Number of Correct Responses on Preliminary
Forethought Questionnaire for Each Group

<u>Age of Subjects</u>	<u>Sex of Subjects</u>	
	Male	Female
3-4	24.3	24.5
	(6.9)	(8.5)
5-6	33.7	32.8
	(6.8)	(7.1)
7-8	45.6	49.3
	(6.0)	(5.0)
9-10	54.7	54.8
	(5.8)	(6.2)
11-12	57.9	58.3
	(4.9)	(4.5)
13-14	59.0	60.2
	(3.8)	(3.8)

Note: Standard deviations are in parentheses,
directly below mean scores. Figures
have been rounded to two decimal places.

Table 4

Means and Standard Deviations for All Subjects; 20 Subscales*

Subscale	Mean	Standard Deviation
1	1.93	1.65
2	4.17	2.07
3	1.76	1.33
4	1.20	1.34
5	2.53	0.96
6	1.28	1.52
7	0.86	0.90
8	3.97	1.35
9	3.78	0.69
10	1.64	0.90
11	3.42	1.01
12	1.57	0.68
13	3.38	0.94
14	2.44	0.83
15	1.42	0.74
16	1.77	0.51
17	2.71	0.66
18	2.23	0.90
19	2.94	1.19
20	1.27	0.80

*Means and standard deviations have been rounded to two decimal places.

Table 5

Means and Standard Deviations for All Males; 20 Subscales*

Subscale	Mean	Standard Deviation
1	2.03	1.67
2	4.19	1.99
3	1.67	1.32
4	1.03	1.26
5	2.48	0.99
6	1.41	1.57
7	0.83	0.90
8	3.89	1.36
9	3.76	0.74
10	1.67	0.88
11	3.36	1.08
12	1.51	0.72
13	3.35	0.96
14	2.41	0.84
15	1.41	0.77
16	1.78	0.46
17	2.71	0.69
18	2.14	0.92
19	2.98	1.21
20	1.27	0.80

*Means and standard deviations have been rounded to two decimal places.

Table 6
Means and Standard Deviations for All Females; 20 Subscales*

Subscale	Mean	Standard Deviation
1	1.83	1.63
2	4.14	2.15
3	1.85	1.34
4	1.37	1.39
5	2.59	0.93
6	1.15	1.46
7	0.89	0.90
8	4.05	1.33
9	3.81	0.63
10	1.61	0.92
11	3.49	0.93
12	1.63	0.63
13	3.41	0.91
14	2.47	0.82
15	1.43	0.71
16	1.75	0.55
17	2.70	0.64
18	2.33	0.87
19	2.91	1.16
20	1.27	0.80

*Means and standard deviations have been rounded to two decimal places.

were computed, i.e., one for all subjects, one for all males, and one for all females, which are shown in Appendices F, G, and H respectively, and then factor analyzed by the method of principal factoring with iteration utilizing the SPSS (Nie, et al., 1975) P2A factor analysis computer subprogram.

The resulting matrices were rotated to terminal factors by the oblique method of rotation (see Appendices I through N). Summaries of the factor loadings for the rotated matrices are shown in Tables 7, 8, and 9.

For the purpose of data reduction, only the factor analysis for all subjects (see Table 7) was used to determine significant factors in the measurement of forethought. This analysis revealed three factors which were measuring forethought. After careful review of the variables within each factor, names were subjectively assigned to each factor. The factors are listed in order of their importance.

Factor 1

Future Time Comprehension

Factor 2

Real Time Consequences

Factor 3

Important Future Events

The proportion of variance accounted for by each of these three factors is shown in Appendix I. The correlations between factors are shown in Table 10.

Table 7

Summary of Rotated Oblique-Factor Pattern Matrix
for All Subjects; 20 Subscales*

Miniscale	Factor			Final Communalities
	1	2	3	
1	.79			.77
2				.72
3	.73			.73
4	.78			.59
5			-.65	.56
6	.85			.68
7	.88			.74
8			-.50	.53
9		.69		.44
10				.63
11		.57		.60
12				.09
13				.45
14		.61		.38
15				.36
16				.09
17		.72		.62
18	.57			.30
19				.35
20				.64

*Rotated factor loadings and final communalities have been rounded to two decimal places.

Table 8

Summary of Rotated Oblique-Factor Pattern Matrix
for All Males; 20 Subscales*

Miniscale	Factor				Final Communalities
	1	2	3	4	
1	.94				.89
2		.52			.68
3	.72				.75
4	.74				.52
5			.60		.61
6	.83				.79
7	.75				.71
8					.48
9		.68			.45
10		.54			.68
11		.56			.53
12				.45	.22
13		.42			.44
14		.61			.35
15	.41				.40
16					.09
17		.82			.68
18				.79	.60
19	.45				.27
20		.45			.58

*Rotated factor loadings and final communalities have been rounded to two decimal places.

Table 9

Summary of Rotated Oblique-Factor Pattern Matrix
for All Females; 20 Subscales*

Miniscale	Factor				Final Communalities
	1	2	3	4	
1	.79				.73
2	.55				.78
3	.67				.73
4	.89				.73
5			-.88		.68
6	.80				.62
7	.87				.80
8			-.52		.57
9		.85			.68
10	.42				.66
11		.43			.70
12					.09
13					.47
14					.44
15					.37
16				.55	.32
17		.47			.60
18	.55				.37
19			.64		.51
20					.76

*Rotated factor loadings and final communalities have been rounded to two decimal places.

Table 10
Matrix of Correlations Between
Three Rotated Factors for All Subjects*

Factor	Factor		
	1	2	3
1			
2	.54		
3	-.48	-.45	

*Correlations have been rounded to two decimal places.

To select items for the finalized Forethought Questionnaire, these procedures were followed. First, the content of the rotated factors for all subjects, all males, and all females were studied. On the basis of this inspection, it was decided that only those subscales with factor loadings $\pm .45$ from the three factors in the rotated factor pattern matrix for all subjects would be included as items in the Forethought Questionnaire. Twelve subscales met this criterion and the 41 items within these subscales are shown in Table 11. The subscales in Factor 1 are listed first, etc., and the subscales are listed in order of the magnitude of their factor loadings. Here it should be noted that any arrangement of these items could be used.

Tests of Significance

To determine whether significant sex differences existed within each factor, three non-directional t-tests for

Table 11

Forethought Questionnaire

1. How many seasons are there in a year?
2. How many months are there in each season?
3. How many days are there in a year?
4. How many years are there in a decade?
5. How many years are there in a century?
6. How often does the earth circle the sun?
7. About how many hours will the sun stay set?
8. About how many hours will the sun stay risen?
9. If you place an ice cube in the sun about how long will it take the ice cube to melt?
10. How many hours are there in one day and night?
11. How many months are there until next Christmas?
12. How many months are there until next Thanksgiving?
13. How many months are there until next Halloween?
14. What month is Christmas in?
15. What month is Thanksgiving in?
16. What month is Halloween in?
17. Next Christmas will come in the summer or the winter?
18. Next Thanksgiving will come in the spring or the fall?
19. Next Halloween will come in the spring or the fall?
20. What will happen to an ice cube if you leave it in the sun?

Table 11 (cont.)

Forethought Questionnaire

21. After you throw a ball up into the air, what will happen to it next?
22. What will happen to a seed after you plant it?
23. Tomorrow will you get up in the morning or at night?
24. Tomorrow will you have breakfast in the morning or at night?
25. Tomorrow will you have dinner in the morning or at night?
26. Tomorrow will you go to school in the morning or at night?
27. If plants do not get watered, what will happen to them?
28. If you step on an ant and crush it, what will happen to it?
29. What happens if you don't feed a dog or give him water?
30. In the summer the weather will be hot or cold?
31. In the winter the weather will be hot or cold?
32. In the summer the weather will be sunny or rainy?
33. In the winter the weather will be sunny or rainy?
34. Will Christmas come once every year?
35. Will Halloween come once every year?
36. Will Thanksgiving come once every year?

Table 11 (cont.)

Forethought Questionnaire

-
- 37. Do plants live forever?
 - 38. Do all animals die?
 - 39. Do you think you will die?
 - 40. Does everyone die?
 - 41. Can you stop yourself or someone else from dying?
-

independent samples were conducted using the SPSS (Nie, et al., 1975) subprogram T-test: Comparison of sample means.

For Factor 1, a t-test was conducted combining subscales with factor loadings on Factor 1 $\geq +.40$ from Tables 8 and 9. Therefore, subscales 1, 2, 3, 4, 6, 7, 15, 18, and 19 were included. (Here it should be noted that subscale 10 was included with Factor 2 because it loaded stronger on Factor 2 and the variables within the subscale reflected the content of Factor 2.) The mean score for these combined subscales was 17.67 for males and 17.89 for females (t [298] = $-.20$, n.s.)

For Factor 2, a t-test was conducted combining subscales with factor loadings on Factor 2 $\geq +.40$ from Tables 8 and 9. Therefore, subscales 9, 10, 11, 13, 14, 17, and 20 were included. (Here it should be noted that subscale 2 was included with Factor 1 because it loaded stronger on Factor 2 and the variables within the subscale reflected the content

of Factor 1.) The mean score on these combined subscales for males was 18.53 and for females was 18.75 (t [298] = $-.45$, n.s.).

For Factor 3, a t -test was conducted combining subscales with factor loadings on Factor 3 $\geq -.40$ from Tables 8 and 9. Therefore, subscales 5 and 8 were included. (Here it should be noted that the factor loading for subscale 19 on Factor 3 was $+.64$, however, this subscale was excluded because it is a positive value, therefore reflecting a measure opposite that of subscales 5 and 8.) The mean score on these combined subscales was 6.37 for males and 6.64 for females (t [298] = -1.15 , n.s.).

Analysis of Variance

Means and standard deviations for all subjects on the 12 subscales used in the ANOVA are presented in Table 4. Means and standard deviations for all subscales within Factors 1, 2, and 3 for all males by age groups are presented in Tables 12, 14, and 16 respectively and in Tables 13, 15, and 17 for all females respectively. From these scores a $2 \times 6 \times 12$ factorial design with repeated measures in the last factor was conducted. The analysis of variance utilized the U.C.L.A. Biomedical computer program BMDP2V: Analysis of variance and covariance, including repeated measures (Dixon & Brown, 1979). Table 18 is a summary of the ANOVA used to determine significant age and sex differences in the

Table 12
Means and Standard Deviations for All Males by Age;
Factor 1

Subscale	<u>Age</u>					
	3-4	5-6	7-8	9-10	11-12	13-14
1	.00 (.00)	.32 (.48)	1.68 (1.18)	3.04 (1.14)	3.52 (.65)	3.60 (.71)
3	.08 (.28)	.28 (.74)	1.64 (.99)	2.24 (.97)	2.80 (.50)	2.96 (.20)
4	.04 (.20)	.16 (.37)	.40 (.87)	1.52 (1.16)	2.32 (1.07)	1.72 (1.31)
6	.00 (.00)	.04 (.20)	.56 (.71)	2.00 (1.35)	2.56 (1.47)	3.28 (.74)
7	.00 (.00)	.04 (.20)	.44 (.71)	1.12 (.88)	1.64 (.57)	1.72 (.54)
18	1.92 (1.00)	1.44 (.96)	1.92 (.76)	2.20 (.76)	2.60 (.71)	2.76 (.66)

Note: Standard deviations are in parentheses, directly below mean scores. Figures have been rounded to two decimal places.

Table 13
Means and Standard Deviations for All Females by Age;
Factor 1

Subscale	<u>Age</u>					
	3-4	5-6	7-8	9-10	11-12	13-14
1	.04 (.20)	.20 (.41)	1.32 (1.28)	2.84 (.94)	3.28 (1.02)	3.28 (.98)
3	.04 .20	.64 .86	2.12 (1.09)	2.52 (1.00)	2.82 (.62)	2.96 (.20)
4	.00 (.00)	.04 (.20)	1.12 (1.36)	2.00 (1.15)	2.56 (.92)	2.48 (.96)
6	.00 (.00)	.00 (.00)	.28 (.68)	1.76 (1.33)	1.96 (1.49)	2.88 (1.05)
7	.00 (.00)	.00 (.00)	.60 (.65)	1.40 (.71)	1.56 (.77)	1.80 (.41)
18	1.88 (1.01)	1.60 (1.00)	2.63 (.86)	2.60 (.58)	2.76 (.44)	2.76 (.44)

Note: Standard deviations are in parentheses, directly below mean scores. Figures have been rounded to two decimal places.

Table 14
Means and Standard Deviations for All Males by Age;
Factor 2

Subscale	<u>Age</u>					
	3-4	5-6	7-8	9-10	11-12	13-14
9	3.08 (1.32)	3.80 (.65)	3.88 (.60)	3.96 (.20)	3.96 (.20)	3.88 (.44)
11	1.96 (1.27)	2.92 (1.26)	3.72 (.46)	3.72 (.74)	3.88 (.33)	3.96 (.20)
14	1.68 (1.11)	2.28 (.94)	2.76 (.44)	2.72 (.46)	2.52 (.82)	2.48 (.65)
17	1.72 (1.06)	2.76 (.60)	2.84 (.37)	2.96 (.20)	3.00 (.00)	3.00 (.00)

Note: Standard deviations are in parentheses, directly below mean scores. Figures have been rounded to two decimal places.

Table 15
Means and Standard Deviations for All Females by Age;

Factor 2

Subscale	<u>Age</u>					
	3-4	5-6	7-8	9-10	11-12	13-14
9	3.24 (1.23)	3.80 (.50)	3.96 (.20)	3.96 (.20)	4.00 (.00)	3.88 (.44)
11	2.20 (1.29)	3.24 (.93)	3.76 (.44)	3.76 (.44)	4.00 (.00)	3.96 (.20)
14	1.56 (1.19)	2.32 (.75)	2.68 (.48)	2.64 (.57)	2.84 (.37)	2.76 (.52)
17	1.72 (.94)	2.76 (.44)	2.88 (.33)	2.88 (.33)	3.00 (.00)	2.96 (.20)

Note: Standard deviations are in parentheses, directly below mean scores. Figures have been rounded to two decimal places.

Table 16
Means and Standard Deviations for All Males by Age;
Factor 3

Subscale	<u>Age</u>					
	3-4	5-6	7-8	9-10	11-12	13-14
5	1.52	2.00	2.64	2.88	2.96	2.88
	(1.33)	(1.26)	(.81)	(.33)	(.20)	(.44)
8	2.16	3.56	4.16	4.44	4.44	4.60
	(1.49)	(1.53)	(.90)	(.92)	(.71)	(.58)

Note: Standard deviations are in parentheses, directly below mean scores. Figures have been rounded to two decimal places.

Table 17
Means and Standard Deviations for All Females by Age;
Factor 3

Subscale	<u>Age</u>					
	3-4	5-6	7-8	9-10	11-12	13-14
5	1.52	2.16	2.96	2.92	2.96	3.00
	(1.29)	(1.21)	(.20)	(.40)	(.20)	(.00)
8	2.24	3.64	4.64	4.56	4.44	4.80
	(1.48)	(1.58)	(.64)	(.58)	(.65)	(.41)

Note: Standard deviations are in parentheses, directly below mean scores. Figures have been rounded to two decimal places.

Table 18

A Summary of the ANOVA used to
Analyze Age and Sex Differences in the
Development of Forethought in Children

Source of Variation	SS	df	MS	F
Age (A)	1798.12	5	359.62	282.75*
Sex (S)	4.07	1	4.07	3.20**
AxS	2.62	5	.52	.41
Error	366.31	288	1.27	
Subscales (F)	3375.78	11	306.89	549.77*
FxA	671.06	55	12.20	21.86*
FxS	22.66	11	2.06	3.69*
FxAxS	23.67	55	.43	.77
Error	1768.41	3168	.56	

Note: * $p < .001$

** $p < .07$

development of forethought in children.

The main effect of Age was highly significant with forethought increasing with increased age. The main effect of Sex failed to reach significance, however, females scored higher on the 12 subscales (mean = 28.51) than did males (mean = 27.71). The Age x Sex interaction failed to reach significance.

The main effect of Subscales was significant. The interaction of Subscales x Age was significant as was the interaction of Subscales x Sex. The interaction of Subscales x Age x Sex failed to reach significance.

CHAPTER IV

DISCUSSION AND CONCLUSIONS

Factor Analysis

Factor analytic results for all subjects revealed that future time comprehension was the most important factor in the measurement of forethought.

As noted in Chapter 1, Ames (1946) found that at 3 years of age the child can answer only a few questions involving future time concepts and this ability develops gradually with increased age. Results were consistent with those of Ames, i.e., children aged 3 through 6 were unable to respond correctly to most questions. She also set the understanding of time at 8 years of age and results of the present study also revealed that children were able to correctly answer questions about proximate future clock time by the age of 7 or 8. Questions reflecting this ability may be found within subscale 2 (see Appendix E) and include variables 30, 32, 34, and 36. Although these questions were not included in the finalized forethought questionnaire, these questions most accurately reflected the child's ability to tell proximate future clock time. Means for these four variables for males, starting with the youngest age group first were 1.16, 1.36, 3.72, 3.96, 3.96, and 3.84, and for females were .68, .72, 3.72, 3.76, 3.72, and 3.88.

Additionally, the present study measured the child's development of remote future time concepts which are reflected in Factor 1 which includes subscales 1, 3, 4, 6, 7, and 18. Mean scores (see Table 12 and 13) demonstrate that the development of more remote future time concepts are not fully developed by the ages of 7 and 8, nor are they quite fully developed by the ages of 13 and 14. Piaget (1969) suggested that the child is able to organize systems of measuring time and to develop a logical understanding of time from the ages of 7 to 11. However, the present study suggests that it takes even longer for the child to develop an accurate conception of remote future time. This suggests that the ability to foresee the remote future requires a greater level of maturity and experience than does the ability to foresee the proximate future. Further, it may be concluded that children aged 13 and 14 still have not developed an adult concept of the future.

Factor analytic results revealed that real time consequences, including cyclic variations, as reflected in questions within subscales 9, 11, 14, and 16 to be the second most important factor in the measurement of forethought. As mentioned in Chapter 1, real time consequences are reflected in the understanding of the physical laws of nature, and the inevitable consequences of these laws. Means shown in Table 14 for all males by age groups and

in Table 15 for all females by age groups reveal that children appear to understand the inevitable laws of nature and their consequences by the age of 7 or 8. This finding does confirm those of Arieti (1957), i.e., that forethought develops enormously during latency.

Results also revealed that anticipation of important future events, as reflected in the questions within subscales 5 and 8, to be the third most important factor in the measurement of forethought. It seems clear that children can accurately anticipate the yearly occurrence of nationally observed holidays by the ages of 7 to 10 as reflected by the mean scores in Table 16 for all males by age groups and Table 17 for all females by age groups.

Another important aspect of this factor is the child's understanding of death and the inevitability of this event. Results showed that children express the view that death is an inevitable occurrence for all life forms by the ages of 7 to 10. This finding was consistent with those of Nagy (1948) and Swain (1975). It appears that before the age of 7 children hold an unrealistic view of death. This was evidenced by the finding in the present study that over 50% of the children between the ages of 3 and 4 expressed the view that death was not personally applicable to them and 30% of these children expressed the view that death is not inevitable. Approximately 40% of the children

in both the 3 to 4 and 5 to 6 year old age groups expressed the view that death is not inevitable for all animals.

Results revealed that by the ages of 7 and 8 children seemed to be aware of the unalterable laws of death. This finding is consistent with those of Anthony (1972) and Swain (1975). Anthony (1972) concluded that age 7 to 8 was a critical age in attaining a concept of death and for most children, the eighth year was the turning point wherein they obviously understood the concept and applied it to human beings and that assimilation was completed by the twelfth year.

Swain (1975) concluded that although children do differ in their concepts of death along an age continuum, the greatest change appears to occur about the time they enter school, that is, age 5 to 7. It is at that time when they begin to demonstrate concepts which are similar to those held by older children, exhibiting less magical thinking and a greater reliance on biological and social reality.

Childs & Wimmer (1971) reported findings which indicated a mild relationship between increased age and acceptance of the universality of death, with age 9 as the age at which children did accept the universality of death.

Zweig (1976) found that children between the ages of 8 and 12 understood the fact of physical death.

These findings clearly suggest that forethought, as reflected by children's concepts of death, increases with age.

Analysis of Variance

Age Differences in Forethought

The most salient feature of the results of the present study was the highly significant age differences in forethought as evidenced by the highly significant main effect of Age (see Table 18). This finding is supportive of clinical observations described by Arieti (1957). For example, he states that forethought develops enormously in children between the ages of 3 and 9. This observation is reflected in the increases in the total mean scores for each age group on all 12 subscales in both males and females (see Tables 12 through 17).

However, Arieti also suggests that the ability to anticipate the future will expand to include all its implications at the early part of adolescence. (Since adolescence ranges from 10 to 18 years of age, early adolescence may be said to range from approximately 10 to 14 years of age.) The present study revealed that the mean (i.e., 36.84) on the 12 subscales for 13 and 14 year old males reflected approximately 90% of the total score

possible and for females the mean (i.e., 37.52) for the 12 subscales for 13 and 14 year olds reflected approximately 91% of the total score. This suggests that children between the ages of 13 and 14 have not yet developed a full capacity to foresee and/or predict the future as measured by the present study.

Sex Differences in Forethought

Overall, sex differences were not apparent in this study. As mentioned in Chapter III, the main effect of Sex failed to reach significance. It should also be noted that although the interaction of Subscales x Sex was significant, this result was probably due to the high F value for the main effect of Subscales, rather than to significant Sex effects or to significant Subscales x Sex interactions. This finding is consistent with previous literature. For example, Ames (1946) suggests that, in spite of individual differences, time concepts develop in a relatively uniform sequence from child to child. Further, Swain (1975) found that sex was not a significant factor related to the concept of death held by children. This finding seems to point to the conclusion that age, concomitant with intellectual maturation and experience, are the most significant factors related to the concept of forethought held by children.

Differential Development on Three Factors

Differential development on the three factors occurred between age groups (see Figures 1 and 2). Factor 2, i.e., Real Time Consequences and Factor 3, i.e., Important Future Events, are learned early in life. However, children show developmental lag in Factor 1, i.e., Future Time Comprehension. Therefore, results suggest that developmental trends in forethought depend upon the subject matter presented to the child. Here it should be noted that Ames (1946) and Piaget (1969) may not have detected this developmental lag in future time comprehension because they did not apply their questions to remote future time.

Conclusions

Two important contributions of the present study were the experimental documentation of the development of forethought in children as a function of age and the documentation of differential development on the three factors used to measure forethought.

A further contribution was the development of the Forethought Questionnaire to measure the normal use of this facility in children ranging in ages from 3 through 14. It should be kept in mind however, that this questionnaire is novel to the literature and should at this time be considered a tentative measure, which will require considerable use before final form can be realized.

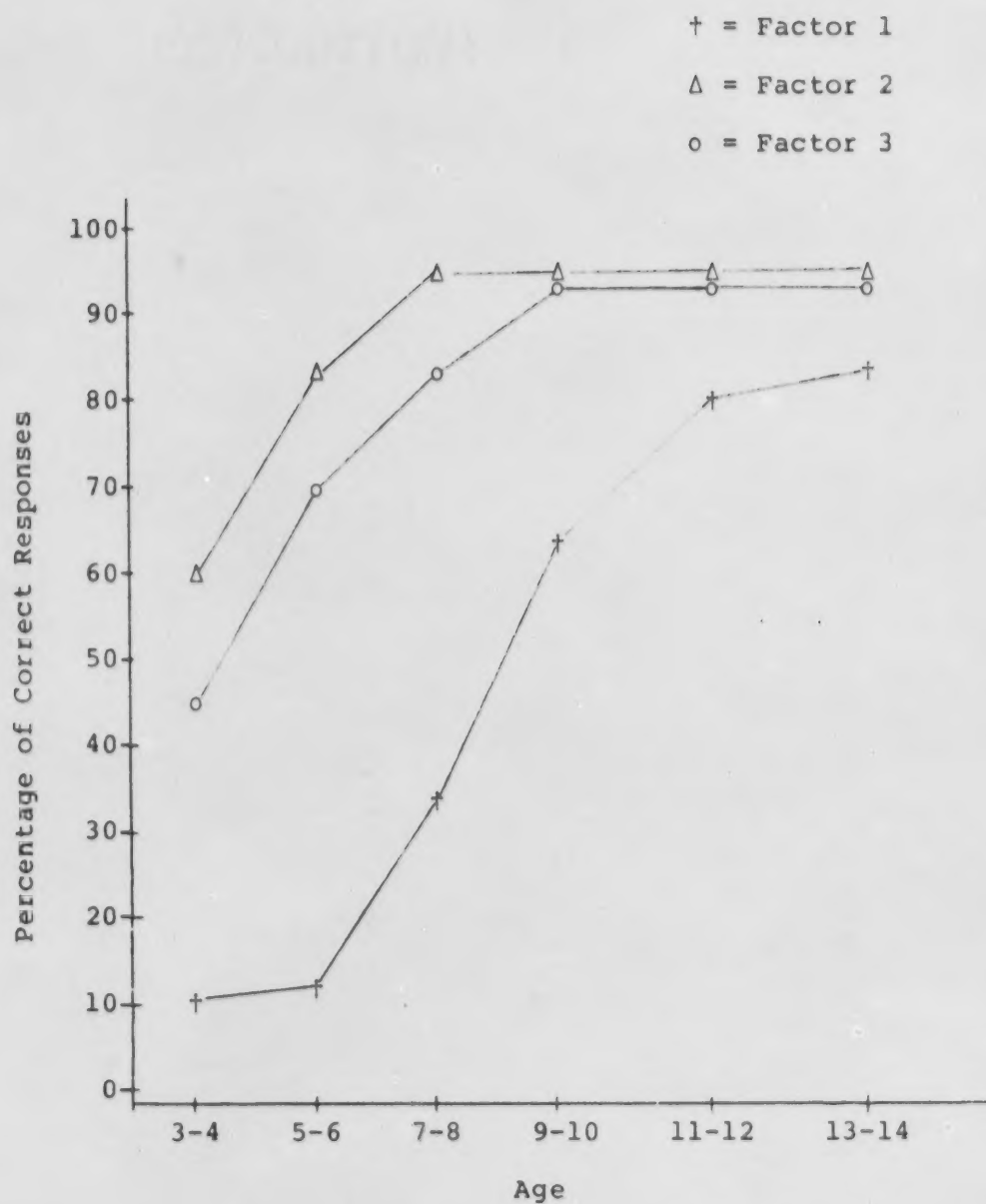


Figure 1. Differential development on three factors for all males by age.

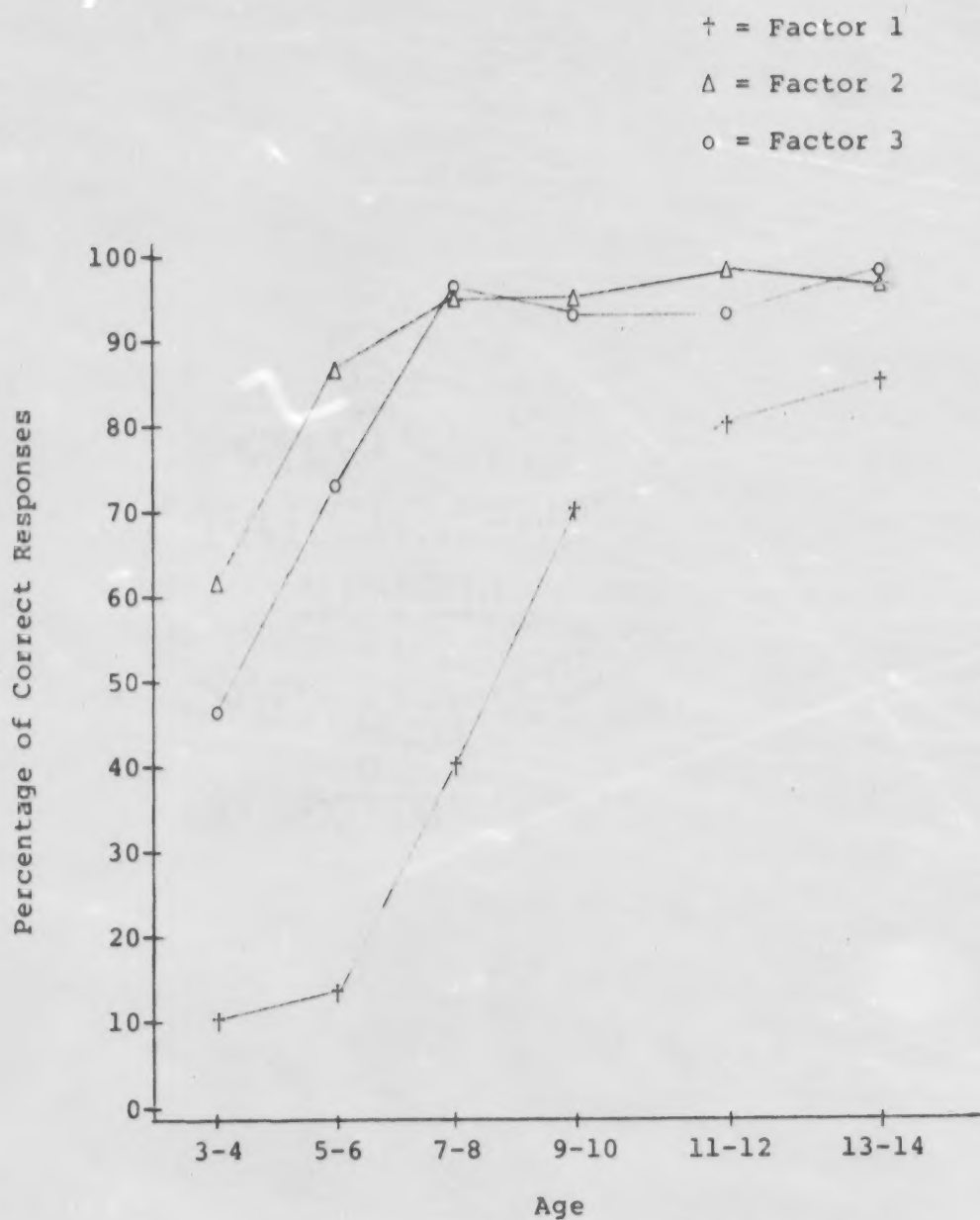


Figure 2. Differential development on three factors for all females by age.

Future research might address children between the ages of 15 and 18 to determine whether remote future time comprehension, as measured by this study, is fully accomplished in the latter half of adolescence. Further, research could be conducted to determine the relationship between forethought and anxiety, criminality, mental deficiency, hemispheric dominance, education, and stress of the environment.

Further, research in the area of learning theory could be enhanced. Most categorizations end with two entities, instinct and learning, but it may be the future sense, a third stratum, that produces the unique attributes of man and from which our behavioral virtuosity flows. Forethought opens a new way in which to view ourselves. It is man, only man, that visions the future.

CHAPTER V

SUMMARY

A study was designed to experimentally document the normal development of forethought, i.e., the capacity to foresee or predict future events, in children as a function of age and sex. A questionnaire representing several aspects which reveal forethought development, i.e., the development of the sense of time, the comprehension of death, the understanding of real time consequences and cyclic variations in the natural environment, and anticipation of important future events, was designed by the researcher. The questionnaire was administered to 150 males and 150 females ranging in age from 3 through 14. Results supported the hypothesis, i.e., forethought develops on a continuum significantly increasing with age with no significant differences due to sex of the child. Factor analytic results revealed three important factors in the measurement of forethought, i.e., Future Time Comprehension, Real Time Consequences, and Important Future Events. The ANOVA showed that children develop differentially on these factors, i.e., the understanding of real time consequences and important future events is evidenced by the ages of 7 to 8 while future time comprehension is not fully accomplished by the ages of 13 to 14. These results suggest that developmental trends in forethought depend upon the subject matter presented to the child.

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Appendix A
Parental Permission Form

Dear Parent:

It is my pleasure to be writing to you to describe the research I am conducting at _____ School. I am pleased to have the cooperation of the principal and the teachers and hope you will give me your support.

The study I am conducting is part of a larger project on the development of forethought in children.

Children's participation is at school and takes very little of their time, one session of about 30 minutes. During this period, children will be presented with questions which measure their ability to anticipate tomorrow. For example, they may be asked, "Will Thanksgiving come in the spring or the fall?"

It is important to point out that this is basic research in child development. I do not evaluate individual students' performance. Rather I am interested in the students as a group. All the data in this study will be kept completely anonymous. There are no foreseeable inconveniences, discomforts or risks in this study.

I hope you are interested in this study. If now or at any time in the future you have questions about the research, please feel free to call me. I will be happy to talk with you.

Appendix A (cont.)

Parental Permission Form

To indicate your consent, please complete and sign the note attached and have your child give it to his or her teacher. It would be helpful if you could return it as soon as possible.

Sincerely,

Appendix A (cont.)

Parental Permission Form

I do ____ do not ____ give permission for my child _____
_____ who is in _____ to participate
(child's class)
in the study described above.

Signed _____
(Parent's Signature)

Appendix B

Preliminary Forethought Questionnaire

Directions: When two answers are given circle the best answer. When a line is given fill in the answer.

- A. The date today is _____
- B. My age is ____ years old.
- C. My birth date is _____
Day Month Year
- D. I am a
(a) girl
(b) boy
1. When the sun sets the sky will be
(a) light
(b) dark
2. About how many hours will the sun stay set? _____
3. When the sun rises the sky will be
(a) light
(b) dark
4. About how many hours will the sun stay risen? _____
5. Will the sun rise every morning? _____
6. Will the sun set every evening? _____
7. In the summer the weather will be
(a) hot
(b) cold

Appendix B (cont.)

Preliminary Forethought Questionnaire

8. In the winter the weather will be
 - (a) hot
 - (b) cold
9. Leaves will be green in the
 - (a) spring
 - (b) fall (autumn)
10. Leaves will turn red, brown, yellow, and orange in the
 - (a) spring
 - (b) fall (autumn)
11. In the summer the weather will be
 - (a) sunny
 - (b) rainy
12. In the spring the leaves will
 - (a) grow on the trees
 - (b) fall off the trees
13. In the winter the weather will be
 - (a) sunny
 - (b) rainy
14. In the fall leaves will
 - (a) grow on the trees
 - (b) fall off the trees
15. What will happen to an ice cube if you leave it in the sun? _____

Appendix B (cont.)

Preliminary Forethought Questionnaire

16. About how long will it take the ice cube to do this?

17. After you throw a ball up into the air, what will
happen to it next? _____

18. What will happen to a seed after you plant it?

19. What will happen when the clouds turn dark grey?

20. Is there a time when the sun does not go down or come
up?

(a) yes

(b) no

If you answered yes, when? _____

21. How many seasons are there in a year? _____

22. How many months are there in each season? _____

23. What will happen to water when you boil it? _____

24. What will happen to water when it becomes very, very
cold? _____

25. If plants do not get watered what will happen to them?

Appendix B (cont.)

Preliminary Forethought Questionnaire

26. If you step on an ant and crush it, what will happen to it? _____
27. What happens if you don't feed a dog or give him water?
28. When something or someone else dies, how long are they dead? _____
29. Tomorrow will you get up
(a) in the morning
(b) at night
30. Tomorrow about what time will you get up? _____
31. Tomorrow will you have breakfast
(a) in the morning
(b) at night
32. Tomorrow what time will you have breakfast? _____
33. Tomorrow will you have dinner
(a) in the morning
(b) at night
34. Tomorrow about what time will you have dinner? _____
35. Tomorrow will you go to school
(a) in the morning
(b) at night
36. Tomorrow about what time will you go to school? _____

Appendix B (cont.)

Preliminary Forethought Questionnaire

37. Will you go to school next Saturday and Sunday? _____
38. Next Christmas will come in the
(a) summer
(b) winter
39. What month is Christmas in? _____
40. How many more months are there until next Christmas?

41. Will Christmas come once every year? _____
42. Next Thanksgiving will come in the
(a) spring
(b) fall
43. What month is Thanksgiving in? _____
44. How many months are there until next Thanksgiving? _____
45. Will Thanksgiving come once a year? _____
46. Do plants live forever? _____
47. Do all animals die? _____
48. Do you think you will die? _____
49. Does everyone die? _____
50. Can you stop yourself or someone else from dying? _____
If you answered yes, how? _____
51. How many hours are there in one day and night? _____
52. How many days are there in a year? _____
53. By what age do you think most people will die? _____

Appendix B (cont.)

Preliminary Forethought Questionnaire

54. How many more months are there until next Halloween comes? _____
55. Will Halloween come once every year? _____
56. What month is Halloween in? _____
57. Next Halloween will come
- (a) in the spring
 - (b) in the fall (autumn)
58. Will you go to school next year?
- (a) yes
 - (b) no
59. Will you still be going to school 5 years from now?
- (a) yes
 - (b) no
60. Will you still be going to school 10 years from now?
- (a) yes
 - (b) no
61. Will you still be going to school 15 years from now?
- (a) yes
 - (b) no
62. What do you want to be when you grow up?
- _____

Appendix B (cont.)

Preliminary Forethought Questionnaire

63. Do you plan to go to college?
- (a) yes
 - (b) no
64. How many years are there in a decade? _____
65. How many years are there in a century? _____
66. How often does the earth circle the sun? _____
- E. Do you usually go to school on Saturday or Sunday?
- (a) yes
 - (b) no

Appendix C

Score Key

- A. Unscored. This question was used to determine the answers to questions 40, 44, and 54.
- B. Unscored
- C. Unscored
- D. Unscored
- 1. B
- 2. 6 to 14 hours
- 3. A
- 4. 8 to 18 hours
- 5. Yes
- 6. Yes
- 7. A
- 8. B
- 9. A
- 10. B
- 11. A
- 12. A
- 13. B
- 14. B
- 15. It will melt.
- 16. 1 to 30 minutes
- 17. It will fall back towards the ground.
- 18. It will grow.

Appendix C (cont.)

Score Key

- 19. Rain
- 20. No
- 21. 4
- 22. 3
- 23. It will evaporate or turn into steam.
- 24. It will freeze or turn into ice.
- 25. They will die.
- 26. It will die.
- 27. It will die.
- 28. Forever
- 29. A
- 30. Between 5 AM and 9 AM
- 31. A
- 32. Between 5 AM and 9 AM
- 33. B
- 34. Between 5 PM and 9 PM
- 35. A
- 36. Between 7 AM and 9 AM
- 37. No (Yes if they indicated a school other than public school.)
- 38. B
- 39. December

Appendix C (cont.)

Score Key

- 40. The correct answer varied according to date of administration.
- 41. Yes
- 42. B
- 43. November
- 44. The correct answer varied according to date of administration.
- 45. Yes
- 46. No
- 47. Yes
- 48. Yes
- 49. Yes
- 50. No
- 51. 24
- 52. 365, 365½, or 366
- 53. 60 to 100
- 54. The correct answer varied according to date of administration.
- 55. Yes
- 56. October
- 57. B
- 58. Yes for all ages.

Appendix C (cont.)

Score Key

- 59. Yes for ages 3 through 13 and for age 14 if they indicated they were going to college.
- 60. Yes for ages 3 through 8, for ages 9 through 12 if they indicated they were going to college, and for ages 13 and 14 if they indicated a professional career which requires more than 4 years of college.
- 61. Yes for ages 3 and 4, for ages 5 through 8 if they indicated they were going to college, and for ages 9 and 10 if they indicated a professional career which requires more than 4 years of college.
- 62. Any realistic occupation
- 63. Yes
- 64. 10
- 65. 100
- 66. Once every year or every 365½ days
- 5. Unscored. This question was used to help determine the accuracy of the response to question 37.

Appendix D

Intercorrelation Matrix for All Subjects; 66 Variables*

Variable	Variable									
	1	2	3	4	5	6	7	8	9	10
1										
2	.06									
3	.28	.10								
4	.11	.75	.17							
5	.03	.23	-.01	.21						
6	.28	.12	.02	.13	.36					
7	.17	.27	.16	.27	.12	.12				
8	.08	.29	.18	.31	.02	.08	.30			
9	.08	.22	.17	.23	.17	.07	.47	.25		
10	.09	.21	.11	.22	.09	.12	.22	.36	.16	
11	.05	.31	.27	.31	.17	.15	.47	.50	.33	.27
12	.08	.37	.13	.34	.15	.09	.35	.45	.26	.35

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	1	2	3	4	5	6	7	8	9	10
13	.08	.27	.06	.27	.02	-.03	.35	.33	.19	.26
14	.21	.21	.07	.25	.00	.05	.19	.25	.15	.17
15	-.01	.23	.29	.25	.10	.10	.38	.30	.19	.27
16	.07	.48	.16	.49	.18	.04	.35	.30	.26	.27
17	.11	.32	.22	.34	.18	.14	.40	.35	.40	.28
18	-.02	.20	.30	.21	.13	.02	.15	.26	.12	.20
19	.03	.39	.25	.43	.20	.04	.35	.40	.36	.41
20	-.02	.20	.07	.24	.21	.11	.22	.24	.16	.20
21	.02	.64	.15	.61	.30	.16	.31	.35	.26	.29
22	.11	.58	.10	.56	.24	.14	.25	.30	.20	.30
23	.08	.25	.01	.29	.13	.16	.11	.17	.10	.16
24	.07	.35	.24	.42	.21	.10	.44	.35	.36	.33

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	1	2	3	4	5	6	7	8	9	10
25	-.05	.14	.18	.14	.03	.08	.20	.24	.20	.24
26	.01	.16	.18	.22	.10	.05	.17	.13	.08	.09
27	.05	.17	.18	.19	.06	-.03	.22	.16	.22	.19
28	.16	.34	.13	.37	.20	.20	.30	.29	.27	.28
29	-.03	.22	.22	.23	.07	.03	.38	.41	.33	.27
30	.11	.44	.19	.47	.18	.10	.36	.37	.24	.28
31	-.05	.13	.21	.17	-.01	.10	.30	.31	.13	.05
32	.13	.48	.18	.46	.21	.16	.33	.38	.23	.30
33	.02	.05	.01	.06	.11	.16	.21	.23	.31	.00
34	.11	.48	.19	.50	.20	.13	.33	.34	.27	.29
35	-.00	.14	.21	.18	.02	.02	.28	.33	.20	.15
36	.13	.51	.16	.52	.24	.11	.39	.39	.29	.35

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	1	2	3	4	5	6	7	8	9	10
37	-.02	.32	.22	.35	.15	.01	.33	.27	.20	.27
38	.05	.30	-.01	.29	.25	.06	.20	.07	.22	.15
39	.10	.56	.22	.55	.18	.15	.39	.40	.28	.35
40	.03	.60	.14	.59	.16	.05	.29	.31	.23	.26
41	-.07	.32	.02	.36	.20	.09	.26	.22	.25	.30
42	.05	.24	.05	.21	.19	.12	.15	.05	.06	.20
43	.16	.55	.18	.55	.21	.18	.36	.32	.23	.31
44	.05	.52	.13	.53	.14	.09	.27	.27	.20	.27
45	.04	.27	.18	.27	.17	.07	.21	.24	.23	.24
46	-.01	.26	.26	.28	-.02	-.05	.37	.28	.29	.26
47	.00	.34	.10	.35	.10	.14	.29	.23	.32	.30
48	-.01	.32	.19	.32	.18	.09	.38	.29	.32	.26

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	1	2	3	4	5	6	7	8	9	10
49	-.01	.28	.05	.32	.11	.09	.27	.18	.28	.33
50	-.10	.01	.00	.04	.09	.05	.17	.14	.15	.16
51	.06	.60	.15	.62	.28	.05	.30	.35	.25	.31
52	.12	.51	.09	.53	.25	.11	.25	.27	.18	.22
53	.03	.41	.22	.42	.16	.04	.36	.34	.28	.29
54	-.01	.54	.07	.49	.15	.10	.20	.23	.15	.25
55	-.02	.34	.09	.38	.22	.11	.29	.28	.28	.32
56	.07	.54	.19	.55	.22	.14	.37	.31	.26	.29
57	.08	.23	.09	.22	.23	.14	.11	.22	.12	.22
58	.03	.29	.09	.29	.08	.13	.28	.29	.13	.11
59	.05	.25	.07	.24	.14	.12	.36	.23	.22	.32
60	.06	.10	.04	.20	.12	.01	.20	.11	.16	.17

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	1	2	3	4	5	6	7	8	9	10
61	.02	.40	.07	.40	.22	.04	.27	.15	.20	.21
62	.10	.17	.10	.19	.11	.11	.20	.17	.10	.09
63	.08	.45	.20	.43	.17	.03	.33	.29	.22	.28
64	.08	.54	.09	.60	.22	.15	.25	.26	.19	.26
65	.11	.64	.11	.67	.25	.20	.31	.31	.22	.30
66	.08	.38	.05	.36	.18	.14	.17	.20	.12	.15

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	11	12	13	14	15	16	17	18	19	20
11										
12	.44									
13	.30	.30								
14	.20	.36	.25							
15	.41	.34	.21	.09						
16	.38	.34	.27	.19	.29					
17	.53	.29	.13	.10	.39	.31				
18	.25	.24	.22	-.04	.45	.20	.33			
19	.43	.42	.35	.15	.44	.47	.46	.34		
20	.17	.26	.15	.04	.21	.31	.26	.18	.39	
21	.35	.44	.32	.17	.28	.49	.37	.23	.47	.29
22	.28	.36	.25	.22	.21	.40	.30	.18	.40	.21

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	11	12	13	14	15	16	17	18	19	20
23	.16	.21	.13	.12	.11	.16	.18	.09	.21	.07
24	.45	.41	.33	.18	.37	.47	.42	.25	.52	.23
25	.35	.27	.21	.04	.38	.30	.24	.36	.41	.20
26	.24	.14	.08	.07	.35	.18	.21	.36	.30	.13
27	.31	.19	.14	.03	.35	.28	.32	.16	.37	.11
28	.48	.38	.34	.22	.33	.38	.36	.24	.44	.21
29	.49	.29	.24	.19	.56	.26	.40	.30	.43	.21
30	.48	.44	.37	.17	.44	.41	.33	.35	.59	.35
31	.35	.15	.13	.01	.46	.13	.27	.22	.29	.17
32	.41	.44	.35	.17	.38	.46	.43	.28	.57	.36
33	.28	.13	-.00	.09	.15	.11	.20	-.05	.16	.16
34	.41	.44	.37	.19	.42	.46	.38	.29	.58	.33

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	11	12	13	14	15	16	17	18	19	20
35	.36	.18	.23	.02	.49	.16	.24	.29	.31	.14
36	.48	.49	.40	.22	.36	.50	.44	.25	.56	.37
37	.38	.39	.25	.16	.50	.36	.35	.40	.45	.33
38	.19	.27	.27	.03	.15	.26	.17	.08	.34	.13
39	.46	.45	.41	.16	.34	.54	.44	.27	.59	.40
40	.33	.39	.27	.19	.25	.46	.36	.21	.41	.28
41	.34	.27	.27	.18	.25	.34	.37	.13	.49	.28
42	.09	.14	.20	.10	.00	.15	.13	.07	.23	.13
43	.38	.38	.32	.19	.25	.46	.39	.24	.44	.25
44	.28	.38	.25	.22	.21	.40	.28	.18	.38	.21
45	.29	.24	.21	.16	.20	.30	.26	.13	.31	.19
46	.37	.27	.16	.14	.40	.31	.34	.25	.42	.28

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	11	12	13	14	15	16	17	18	19	20
47	.28	.34	.34	.14	.22	.30	.24	.20	.40	.20
48	.42	.36	.34	.05	.46	.31	.40	.45	.48	.21
49	.25	.31	.32	.05	.25	.24	.35	.33	.36	.15
50	.17	.13	.20	.05	.14	.11	.10	.16	.18	.16
51	.39	.45	.33	.16	.28	.59	.42	.25	.53	.39
52	.28	.33	.23	.11	.17	.40	.28	.17	.37	.23
53	.45	.36	.31	.12	.36	.55	.43	.33	.61	.37
54	.24	.34	.19	.16	.20	.39	.25	.19	.36	.23
55	.34	.27	.24	.15	.35	.36	.39	.25	.54	.25
56	.40	.44	.35	.19	.32	.47	.42	.26	.52	.27
57	.10	.16	.10	.07	.09	.18	.19	.05	.19	-.00
58	.29	.36	.21	.16	.23	.30	.21	.30	.25	.19

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	11	12	13	14	15	16	17	18	19	20
59	.25	.37	.21	.07	.32	.29	.28	.26	.30	.25
60	.07	.11	.12	.02	.10	.22	.15	.18	.14	.07
61	.20	.25	.17	.09	.18	.33	.23	.12	.26	.19
62	.28	.15	.04	.13	.31	.24	.17	.17	.25	.15
63	.42	.41	.27	.12	.40	.46	.39	.28	.46	.26
64	.26	.32	.23	.18	.20	.40	.30	.17	.36	.22
65	.30	.34	.26	.18	.24	.48	.31	.20	.43	.31
66	.19	.22	.15	.07	.13	.26	.19	.11	.25	.17

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	21	22	23	24	25	26	27	28	29	30
21										
22	.67									
23	.36	.39								
24	.45	.39	.22							
25	.23	.20	.14	.26						
26	.19	.13	-.00	.22	.32					
27	.21	.17	.15	.26	.34	.15				
28	.41	.34	.25	.42	.30	.26	.24			
29	.26	.20	.10	.30	.31	.24	.34	.33		
30	.50	.40	.22	.43	.33	.28	.23	.45	.36	
31	.13	.11	.09	.27	.25	.20	.24	.22	.51	.33
32	.56	.43	.25	.43	.28	.17	.26	.45	.37	.70

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	21	22	23	24	25	26	27	28	29	30
33	.09	.04	.08	.16	.02	-.03	.04	.21	.24	.14
34	.57	.45	.26	.46	.33	.25	.29	.45	.33	.70
35	.18	.09	.10	.28	.22	.22	.23	.22	.59	.32
36	.61	.48	.27	.49	.23	.17	.26	.51	.32	.68
37	.39	.30	.13	.44	.30	.27	.31	.36	.43	.45
38	.33	.28	.15	.35	.14	.08	.23	.35	-.02	.33
39	.63	.51	.28	.48	.32	.18	.27	.54	.28	.60
40	.62	.56	.37	.36	.22	.16	.14	.32	.23	.42
41	.38	.27	.13	.35	.11	.11	.17	.35	.25	.34
42	.27	.24	.07	.17	.07	.11	.04	.23	.03	.21
43	.63	.54	.24	.41	.27	.16	.17	.44	.23	.50
44	.61	.53	.29	.33	.20	.16	.09	.32	.20	.38

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	21	22	23	24	25	26	27	28	29	30
45	.34	.23	.12	.28	.04	.09	.18	.27	.19	.27
46	.30	.27	.16	.35	.31	.18	.28	.33	.45	.33
47	.36	.30	.16	.37	.18	.11	.19	.35	.16	.36
48	.41	.30	.18	.46	.24	.16	.26	.41	.32	.39
49	.33	.25	.13	.32	.12	.07	.17	.30	.17	.32
50	.11	.10	.07	.18	.12	.04	.08	.15	.15	.16
51	.75	.59	.31	.45	.34	.24	.24	.50	.28	.53
52	.56	.56	.31	.33	.22	.16	.18	.36	.18	.35
53	.47	.39	.20	.45	.29	.19	.29	.38	.33	.56
54	.58	.52	.29	.30	.20	.17	.11	.29	.18	.38
55	.38	.29	.15	.35	.16	.16	.21	.35	.28	.38
56	.59	.54	.26	.43	.28	.13	.25	.43	.29	.50

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	21	22	23	24	25	26	27	28	29	30
57	.35	.31	.20	.26	.08	.01	.06	.15	.09	.14
58	.30	.25	.14	.24	.24	.21	.15	.33	.17	.32
59	.30	.23	.07	.21	.22	.20	.17	.34	.29	.31
60	.17	.21	.19	.15	.11	.15	-.02	.13	.05	.16
61	.40	.33	.18	.32	.06	.12	.09	.24	.14	.25
62	.16	.09	.00	.15	.16	.23	.26	.23	.29	.26
63	.48	.36	.19	.39	.18	.20	.27	.41	.31	.48
64	.58	.60	.28	.36	.18	.18	.12	.41	.19	.37
65	.64	.62	.28	.41	.19	.15	.14	.39	.22	.45
66	.45	.43	.27	.20	.13	.08	.17	.29	.12	.23

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	31	32	33	34	35	36	37	38	39	40
31										
32	.23									
33	.36	.13								
34	.25	.72	.14							
35	.55	.27	.30	.29						
36	.20	.71	.21	.69	.33					
37	.34	.41	.17	.42	.34	.42				
38	-.04	.33	.08	.40	-.03	.36	.25			
39	.23	.62	.16	.60	.26	.70	.51	.39		
40	.11	.47	.03	.48	.13	.53	.35	.29	.57	
41	.18	.37	.15	.45	.16	.41	.31	.19	.43	.29
42	-.01	.23	.04	.25	.05	.24	.08	.20	.25	.25

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	31	32	33	34	35	36	37	38	39	40
43	.14	.55	.09	.54	.19	.58	.37	.33	.70	.55
44	.08	.41	.07	.46	.18	.52	.30	.28	.52	.77
45	.14	.31	.09	.36	.18	.36	.18	.17	.37	.25
46	.30	.37	.13	.34	.32	.40	.46	.15	.39	.26
47	.14	.35	.15	.38	.12	.43	.35	.17	.44	.34
48	.31	.38	.25	.36	.35	.46	.42	.22	.48	.30
49	.12	.28	.17	.31	.16	.35	.31	.18	.36	.28
50	.12	.13	-.07	.18	.11	.12	.16	.06	.08	.07
51	.12	.62	.07	.60	.18	.65	.42	.36	.67	.59
52	.10	.42	.06	.41	.13	.45	.29	.24	.50	.46
53	.22	.57	.12	.58	.26	.59	.44	.34	.61	.42
54	.09	.44	.05	.46	.16	.51	.28	.28	.50	.68

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	31	32	33	34	35	36	37	38	39	40
55	.14	.42	.15	.47	.20	.43	.36	.21	.45	.31
56	.19	.57	.09	.56	.22	.59	.39	.36	.79	.57
57	.07	.21	.08	.18	.08	.24	.13	.27	.23	.22
58	.16	.32	.04	.27	.16	.35	.34	.14	.38	.27
59	.16	.32	.22	.33	.17	.37	.23	.11	.33	.26
60	.01	.14	-.01	.13	.07	.11	.08	.06	.12	.12
61	.01	.31	-.00	.28	.10	.33	.19	.12	.29	.36
62	.22	.18	.01	.13	.15	.21	.28	.06	.17	.11
63	.20	.51	.13	.50	.24	.52	.39	.25	.48	.40
64	.10	.41	.06	.44	.11	.44	.30	.22	.47	.50
65	.13	.50	.10	.51	.15	.52	.36	.26	.55	.51
66	.03	.27	.05	.30	.09	.31	.20	.19	.34	.29

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	41	42	43	44	45	46	47	48	49	50
41										
42	.14									
43	.34	.38								
44	.27	.25	.68							
45	.60	.22	.32	.25						
46	.28	-.00	.32	.21	.19					
47	.40	.26	.33	.30	.31	.30				
48	.37	.15	.37	.28	.31	.41	.48			
49	.37	.11	.29	.25	.27	.25	.49	.68		
50	.14	-.04	.07	.09	.16	.26	.18	.25	.17	
51	.43	.23	.64	.53	.35	.37	.37	.37	.32	.07
52	.26	.28	.57	.47	.23	.22	.26	.28	.25	-.02

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	41	42	43	44	45	46	47	48	49	50
53	.44	.18	.52	.40	.34	.32	.33	.42	.35	.11
54	.27	.26	.58	.78	.27	.21	.30	.31	.25	.07
55	.79	.18	.38	.31	.63	.28	.42	.44	.42	.20
56	.35	.29	.75	.60	.34	.35	.38	.42	.30	.07
57	.12	.27	.30	.28	.15	.03	.18	.27	.18	-.08
58	.29	.09	.33	.27	.35	.13	.30	.30	.25	.05
59	.32	.09	.27	.23	.30	.24	.31	.35	.33	.11
60	.19	.04	.13	.10	.16	.10	.15	.15	.19	.11
61	.27	.21	.31	.32	.29	.17	.29	.25	.25	.13
62	.14	-.04	.18	.11	.03	.18	.08	.17	.09	.01
63	.48	.23	.44	.39	.33	.35	.41	.47	.44	.05
64	.28	.28	.58	.53	.23	.25	.26	.26	.23	.03

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	41	42	43	44	45	46	47	48	49	50
65	.33	.26	.61	.50	.25	.27	.36	.33	.31	.06
66	.19	.19	.41	.35	.13	.19	.21	.17	.17	.10

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	51	52	53	54	55	56	57	58	59	60
51										
52	.59									
53	.53	.42								
54	.53	.49	.38							
55	.41	.28	.50	.29						
56	.62	.51	.54	.59	.41					
57	.28	.26	.19	.26	.20	.27				
58	.33	.25	.35	.26	.32	.34	.12			
59	.32	.22	.31	.19	.30	.27	.04	.45		
60	.26	.19	.16	.08	.21	.08	.09	.27	.28	
61	.44	.36	.25	.30	.35	.26	.16	.28	.37	.32
62	.21	.12	.21	.12	.12	.16	.04	.14	.16	.03

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable									
	51	52	53	54	55	56	57	58	59	60
63	.51	.33	.51	.36	.49	.48	.17	.34	.39	.15
64	.58	.60	.36	.49	.30	.51	.29	.23	.21	.19
65	.64	.60	.46	.51	.35	.57	.30	.30	.28	.14
66	.41	.51	.27	.34	.19	.37	.21	.17	.14	.19

Appendix D (cont.)

Intercorrelation Matrix for All Subjects; 66 Variables

Variable	Variable					
	61	62	63	64	65	66
61						
62	.12					
63	.28	.32				
64	.39	.19	.38			
65	.44	.20	.47	.77		
66	.26	.16	.28	.50	.48	

*Correlations have been rounded to two decimal places.

Appendix E

Subscales

Subscale 1

- 2. About how many hours will the sun stay set?
- 4. About how many hours will the sun stay risen?
- 16. About how long will it take the ice cube to do this?
- 51. How many hours are there in one day and night?

Subscale 2

- 20. Is there a time when the sun does not go down or come up?
- 30. Tomorrow about what time will you get up?
- 32. Tomorrow what time will you have breakfast?
- 34. Tomorrow about what time will you have dinner?
- 36. Tomorrow about what time will you go to school?
- 37. Will you go to school next Saturday and Sunday?

Subscale 3

- 39. What month is Christmas in?
- 43. What month is Thanksgiving in?
- 56. What month is Halloween in?

Subscale 4

- 40. How many more months are there until next Christmas?
- 44. How many months are there until next Thanksgiving?
- 54. How many more months are there until next Halloween comes?

Appendix E (cont.)

Subscales

Subscale 5

- 41. Will Christmas come once every year?
- 45. Will Thanksgiving come once a year?
- 55. Will Halloween come once every year?

Subscale 6

- 52. How many days are there in a year?
- 64. How many years are there in a decade?
- 65. How many years are there in a century?
- 66. How often does the earth circle the sun?

Subscale 7

- 21. How many seasons are there in a year?
- 22. How many months are there in each season?

Subscale 8

- 46. Do plants live forever?
- 47. Do all animals die?
- 48. Do you think you will die?
- 49. Does everyone die?
- 50. Can you stop yourself or someone else from dying?

Subscale 9

- 29. Tomorrow will you get up in the morning or at night?
- 31. Tomorrow will you have breakfast in the morning or at night?

Appendix E (cont.)

Subscales

Subscale 9

- 33. Tomorrow will you have dinner in the morning or at night?
- 35. Tomorrow will you go to school in the morning or at night?

Subscale 10

- 19. What will happen when the clouds turn dark grey?
- 23. What will happen to water when you boil it?
- 24. What will happen to water when it becomes very very cold?

Subscale 11

- 7. In the summer the weather will be hot or cold?
- 8. In the winter the weather will be hot or cold?
- 11. In the summer the weather will be sunny or rainy?
- 13. In the winter the weather will be sunny or rainy?

Subscale 12

- 5. Will the sun rise every morning?
- 6. Will the sun set every evening?

Subscale 13

- 9. Leaves will be green in the spring or the fall?
- 10. Leaves will turn red, brown, yellow, and orange in the spring or the fall?

Appendix E (cont.)

Subscales

Subscale 13

12. In the spring the leaves will grow on the trees or fall off the trees?
14. In the fall leaves will grow on the trees or fall off the trees?

Subscale 14

25. If plants do not get watered what will happen to them?
26. If you step on an ant and crush it, what will happen to it?
27. What happens if you don't feed a dog or give him water?

Subscale 15

62. What do you want to be when you grow up?
63. Do you plan to go to college?

Subscale 16

1. When the sun sets the sky will be light or dark?
3. When the sun rises the sky will be light or dark?

Subscale 17

15. What will happen to an ice cube if you leave it in the sun?
17. After you throw a ball up into the air, what will happen to it next?
18. What will happen to a seed after you plant it?

Appendix E (cont.)

Subscales

Subscale 18

- 38. Next Christmas will come in the summer or winter?
- 42. Next Thanksgiving will come in the spring or fall?
- 57. Next Halloween will come in the spring or the fall?

Subscale 19

- 58. Will you go to school next year?
- 59. Will you still be going to school 5 years from now?
- 60. Will you still be going to school 10 years from now?
- 61. Will you still be going to school 20 years from now?

Subscale 20

- 28. When something or someone else dies, how long are they dead?
- 53. By what age do you think most people will die?

Appendix F

Intercorrelation Matrix for All Subjects; 20 Subscales*

Subscale	Subscale									
	1	2	3	4	5	6	7	8	9	10
1										
2	.70									
3	.74	.72								
4	.68	.57	.69							
5	.47	.51	.47	.35						
6	.74	.56	.67	.61	.35					
7	.76	.61	.69	.69	.39	.74				
8	.45	.56	.48	.37	.50	.36	.42			
9	.25	.44	.29	.19	.27	.19	.21	.37		
10	.62	.68	.61	.51	.48	.53	.60	.56	.40	
11	.51	.60	.56	.39	.41	.41	.46	.53	.53	.58
12	.23	.24	.24	.16	.20	.27	.28	.14	.10	.22

Appendix F (cont.)

Intercorrelation Matrix for All Subjects; 20 Subscales

Subscale	Subscale									
	1	2	3	4	5	6	7	8	9	10
13	.50	.55	.50	.43	.41	.41	.48	.49	.31	.56
14	.37	.43	.34	.25	.22	.27	.29	.33	.37	.45
15	.50	.52	.44	.34	.38	.40	.38	.39	.32	.42
16	.16	.18	.20	.09	.04	.14	.13	.06	.10	.19
17	.45	.58	.48	.35	.40	.34	.39	.52	.52	.55
18	.41	.38	.48	.43	.28	.43	.45	.23	.07	.41
19	.50	.43	.39	.35	.44	.43	.43	.41	.19	.39
20	.63	.72	.68	.47	.51	.54	.53	.52	.39	.66

Appendix F (cont.)

Intercorrelation Matrix for All Subjects; 20 Subscales

Subscale	Subscale									
	11	12	13	14	15	16	17	18	19	20
11										
12	.14									
13	.62	.17								
14	.39	.08	.31							
15	.43	.16	.36	.38						
16	.22	.14	.21	.14	.18					
17	.55	.19	.43	.54	.46	.22				
18	.27	.28	.31	.17	.21	.10	.20			
19	.39	.18	.40	.26	.34	.09	.38	.21		
20	.59	.22	.51	.44	.51	.20	.55	.39	.43	

*Correlations have been rounded to two decimal places.

Appendix G

Intercorrelation Matrix for All Males; 20 Subscales*

Subscale	Subscale									
	1	2	3	4	5	6	7	8	9	10
1										
2	.68									
3	.80	.66								
4	.66	.43	.65							
5	.49	.48	.45	.30						
6	.80	.57	.75	.62	.37					
7	.76	.56	.73	.64	.36	.76				
8	.48	.52	.45	.32	.48	.39	.41			
9	.27	.46	.29	.14	.35	.21	.21	.35		
10	.62	.65	.58	.43	.43	.50	.56	.55	.47	
11	.54	.56	.53	.34	.31	.46	.46	.45	.51	.56
12	.28	.24	.25	.17	.15	.33	.27	.13	.09	.26

Appendix G (cont.)

Intercorrelation Matrix for All Males; 20 Subscales

Subscale	Subscale									
	1	2	3	4	5	6	7	8	9	10
13	.51	.49	.48	.36	.33	.43	.45	.50	.32	.55
14	.30	.39	.25	.11	.07	.23	.20	.24	.31	.35
15	.55	.51	.46	.37	.37	.49	.42	.40	.31	.42
16	.17	.16	.13	.09	-.05	.21	.17	.04	-.02	.19
17	.46	.61	.45	.32	.31	.36	.37	.48	.52	.57
18	.36	.27	.45	.36	.24	.46	.44	.23	.05	.43
19	.51	.34	.36	.30	.33	.39	.37	.36	.20	.27
20	.62	.69	.64	.37	.44	.56	.49	.48	.40	.59

Appendix G (cont.)

Intercorrelation Matrix for All Males; 20 Subscales

Subscale	Subscale									
	11	12	13	14	15	16	17	18	19	20
11										
12	.11									
13	.64	.20								
14	.29	.10	.28							
15	.40	.15	.35	.33						
16	.12	.20	.17	-.01	.08					
17	.52	.15	.45	.53	.50	.14				
18	.21	.38	.32	.06	.20	-.01	.19			
19	.36	.12	.36	.17	.32	.04	.28	.17		
20	.56	.21	.40	.36	.49	.05	.55	.34	.39	

*Correlations have been rounded to two decimal places.

Appendix H

Intercorrelation Matrix for All Females; 20 Subscales*

Subscale	Subscale									
	1	2	3	4	5	6	7	8	9	10
1										
2	.71									
3	.69	.78								
4	.73	.69	.73							
5	.46	.54	.48	.39						
6	.67	.56	.60	.64	.34					
7	.76	.67	.65	.73	.41	.73				
8	.42	.60	.50	.40	.51	.33	.44			
9	.25	.44	.28	.24	.16	.18	.20	.39		
10	.63	.69	.64	.60	.54	.56	.65	.57	.33	
11	.50	.66	.59	.45	.54	.37	.46	.62	.56	.62
12	.18	.25	.21	.12	.24	.23	.29	.14	.09	.20

Appendix H (cont.)

Intercorrelation Matrix for All Females; 20 Subscales

Subscale	Subscale									
	1	2	3	4	5	6	7	8	9	10
13	.49	.60	.52	.51	.50	.39	.50	.46	.29	.58
14	.44	.48	.44	.37	.39	.32	.38	.43	.45	.56
15	.45	.53	.41	.32	.40	.31	.33	.39	.34	.42
16	.15	.20	.27	.09	.13	.08	.09	.08	.23	.19
17	.44	.46	.52	.39	.51	.33	.41	.57	.52	.54
18	.48	.49	.49	.48	.31	.42	.47	.22	.08	.40
19	.49	.53	.42	.41	.57	.47	.49	.48	.20	.51
20	.65	.74	.72	.56	.59	.53	.56	.57	.37	.72

Appendix H (cont.)

Intercorrelation Matrix for All Females; 20 Subscales

Subscale	Subscale									
	11	12	13	14	15	16	17	18	19	20
11										
12	.16									
13	.61	.13								
14	.51	.05	.35							
15	.48	.16	.38	.43						
16	.32	.09	.26	.27	.27					
17	.60	.24	.40	.55	.42	.30				
18	.33	.15	.28	.29	.21	.20	.21			
19	.44	.26	.44	.36	.38	.13	.48	.28		
20	.63	.23	.61	.52	.54	.32	.54	.45	.48	

*Correlations have been rounded to two decimal places.

Appendix I

Rotated Oblique-Factor Pattern Matrix for All Subjects; 20 Subscales*

Subscale	Factor			Final Communalities
	1	2	3	
1	.79	.08	-.08	.77
2	.43	.41	-.19	.72
3	.73	.17	-.05	.73
4	.78	-.01	.02	.59
5	.16	.01	-.65	.56
6	.85	-.03	.04	.68
7	.88	-.02	.00	.74
8	.08	.29	-.50	.53
9	-.19	.69	-.11	.44
10	.38	.39	-.20	.63
11	.12	.57	-.22	.60
12	.28	.00	-.04	.09

Appendix I (cont.)

Rotated Oblique-Factor Pattern Matrix for All Subjects; 20 Subscales

Subscale	Factor			Final Communalities
	1	2	3	
13	.26	.30	-.26	.45
14	.03	.61	.02	.38
15	.20	.37	-.16	.36
16	.09	.28	.13	.09
17	-.01	.72	-.15	.62
18	.57	-.07	-.02	.30
19	.27	.06	-.37	.35
20	.36	.39	-.23	.64

Proportion
of Total
Variance

83.60

12.20

4.20

*Rotated factor loadings and final communalities have been rounded to two decimal places.

Appendix J

Rotated Oblique-Factor Pattern Matrix for All Males; 20 Subscales*

Subscale	Factor				Final Communalities
	1	2	3	4	
1	.94	.06	-.00	-.05	.89
2	.35	.52	-.07	.07	.68
3	.72	.09	-.03	.15	.75
4	.74	-.11	.03	.07	.52
5	.31	.11	-.60	.10	.61
6	.83	.05	.11	.15	.79
7	.75	-.03	.07	.17	.71
8	.19	.40	.30	.11	.48
9	-.12	.68	-.17	.01	.45
10	.07	.54	-.08	.40	.68
11	.21	.56	-.04	.05	.53
12	.01	.04	.08	.45	.22

Appendix J (cont.)

Rotated Oblique-Factor Pattern Matrix for All Males; 20 Subscales

Subscale	Factor				Final Communalities
	1	2	3	4	
13	.16	.42	-.05	.22	.44
14	-.02	.61	.19	-.07	.35
15	.41	.34	-.03	-.07	.40
16	.12	.07	.24	.07	.09
17	.01	.82	.08	.03	.68
18	.00	-.07	-.07	.79	.60
19	.45	.11	-.14	-.08	.27
20	.32	.45	-.12	.12	.58
Proportion of Total Variance	76.70	12.90	5.30	5.10	

*Rotated factor loadings and final communalities have been rounded to two decimal places.

Appendix K

Rotated Oblique-Factor Pattern Matrix for All Females; 20 Subscales*

Subscale	Factor				Final Communalities
	1	2	3	4	
1	.79	.05	-.06	.02	.73
2	.55	.22	-.22	.13	.78
3	.67	.07	-.08	.23	.73
4	.89	.07	.08	-.04	.73
5	-.08	-.09	-.88	.09	.68
6	.80	-.01	-.03	-.12	.62
7	.87	.04	-.07	-.18	.80
8	.04	.37	-.52	-.09	.57
9	.03	.85	.15	.06	.68
10	.42	.18	-.34	.08	.66
11	.10	.43	-.32	.24	.70
12	.09	-.03	-.26	-.02	.09

Appendix K (cont.)

Rotated Oblique-Factor Pattern Matrix for All Females; 20 Subscales

Subscale	Factor				Final Communalities
	1	2	3	4	
13	.25	.10	-.34	.19	.47
14	.15	.38	-.16	.20	.44
15	.09	.20	-.28	.25	.37
16	-.03	.08	.03	.55	.32
17	.01	.47	-.40	.09	.60
18	.55	-.15	.01	.23	.37
19	.13	.04	-.64	-.08	.51
20	.35	.08	-.35	.35	.76
Proportion of Total Variance	78.70	11.90	5.50	3.90	

*Rotated factor loadings and final communalities have been rounded to two decimal places.

Appendix L

Rotated Oblique-Factor Structure Matrix for All Subjects; 20 Subscales*

Subscale	Factor		
	1	2	3
1	.87	.54	-.49
2	.74	.72	-.58
3	.84	.58	-.47
4	.77	.40	-.35
5	.48	.39	-.73
6	.82	.41	-.36
7	.86	.45	-.40
8	.47	.56	-.67
9	.23	.64	-.33
10	.68	.68	-.55
11	.53	.73	-.53
12	.30	.17	-.18

Appendix L (cont.)

Rotated Oblique-Factor Structure Matrix for All Subjects; 20 Subscales*

Subscales	Factor		
	1	2	3
13	.55	.56	-.52
14	.34	.61	-.27
15	.47	.55	-.42
16	.18	.27	-.04
17	.45	.78	-.47
18	.55	.25	-.26
19	.48	.38	-.53
20	.68	.68	-.58

*Rotated factor loadings have been rounded to two decimal places.

Appendix M

Rotated Oblique-Factor Structure Matrix for All Males; 20 Subscales*

Subscale	Factor			
	1	2	3	4
1	.94	.56	-.12	.51
2	.69	.75	-.19	.43
3	.86	.53	-.12	.59
4	.71	.31	-.03	.46
5	.49	.40	-.65	.30
6	.87	.43	.03	.61
7	.83	.43	-.01	.60
8	.51	.58	-.38	.33
9	.27	.64	-.27	.13
10	.61	.71	-.16	.59
11	.55	.70	-.15	.33
12	.28	.16	.08	.46

Appendix M (cont.)

Rotated Oblique-Factor Structure Matrix for All Males; 20 Subscales

Subscale	Factor			
	1	2	3	4
13	.53	.59	-.13	.44
14	.26	.56	.09	.10
15	.56	.55	-.13	.26
16	.17	.12	.22	.16
17	.47	.82	-.05	.27
18	.43	.17	-.05	.77
19	.48	.36	-.21	.21
20	.64	.68	-.22	.32

*Rotated factor loadings have been rounded to two decimal places.

Appendix N

Rotated Oblique-Factor Structure Matrix for All Females; 20 Subscales*

Subscale	Factor			
	1	2	3	4
1	.85	.35	-.60	.31
2	.80	.55	-.71	.46
3	.81	.41	-.61	.49
4	.85	.33	-.51	.24
5	.48	.30	-.82	.32
6	.78	.24	-.50	.14
7	.88	.31	-.59	.14
8	.48	.58	-.68	.23
9	.24	.81	-.25	.33
10	.72	.50	-.71	.39
11	.54	.70	-.65	.54
12	.24	.10	-.29	.08

Appendix N (cont.)

Rotated Oblique-Factor Structure Matrix for All Females; 20 Subscales*

Subscale	Factor			
	1	2	3	4
13	.56	.40	-.60	.42
14	.44	.57	-.48	.44
15	.42	.44	-.50	.44
16	.16	.26	-.17	.56
17	.45	.67	-.63	.39
18	.57	.12	-.35	.35
19	.52	.32	-.71	.18
20	.72	.49	-.73	.61

*Rotated factor loadings have been rounded to two decimal places.